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Confronting objections to performance pay: A study of the impact of individual and gain-sharing incentives on the job satisfaction of British employees[1]

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Abstract

The increasing interest in incentive pay schemes in recent years has raised concerns regarding their potential damaging effect on *intrinsic* job satisfaction, or the security of employment. This study explores the impact of both individual and gain-sharing incentives on the overall job satisfaction of workers in the UK, as well as their satisfaction with various facets of jobs, namely total pay, job security, and the actual work itself. Using data from six waves (1998-2003) of the British Household Panel Survey (BHPS), and after correcting for the sorting problem that arises, no significant difference in overall job utility is found between those receiving performance-related pay (PRP) and those on other methods of compensation. In addition, non-economic arguments that PRP crowds-out the intrinsic satisfaction of jobs are also not supported, as are popular concerns regarding the adverse impact of PRP schemes on job security. An important asymmetry in the manner in which individual and gain-sharing incentives affect the utility of employees is nonetheless unearthed, as the latter are consistently found to have a positive effect on employee well-being.

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1. Introduction

When faced with the classical agency problem, whereby the interests of the worker and the firm are misaligned, reward mechanisms will be designed in such a way that induces employees to act in their employers' best interests. Mirlees (1976) and Holmström (1979) were among the first to demonstrate the theoretical dominance of performance-related pay (PRP) over alternative reward systems when monitoring effort is costly and imperfect. Indeed, such incentive schemes have increasingly found favour in many organisations in the UK, as well as other advanced Western economies. In fact, the widespread use of incentive rewards in boardroom pay deals in the private sector, as noted by Murphy (1999), has now also become common practice in the public sector. For example, the use of explicit incentives to enhance the provision of public sector services is an important component of the UK Government's public service modernisation agenda (Burgess and Ratto, 2003).

Notwithstanding the substantial insights that agency analysis has offered with respect to resolving the problem of 'moral hazard' in the workplace, a number of shortcomings have now been pointed out. The thrust of these arguments is that the introduction of incentive pay schemes may lead to dysfunctional behavioural responses when measured performance, as specified in the incentive contract, is not closely related to the worker's total contribution to the value of the firm.[i] For example, rewarding workers based only on a subset of tasks may induce them to manipulate or "game" the compensation system to their advantage, a phenomenon known as "multitasking" (Holmström and Milgrom, 1991; and Baker, 1992). In this case the worker will direct his entire effort towards those activities that are directly rewarded, to the detriment of other equally valuable tasks for

the firm. Subjective appraisal has been heralded as a solution to this unintended side-effect of PRP on the grounds that it can take a holistic view of performance, encompassing the totality of contributions by workers. However, subjective performance evaluation is no less contentious. Supervisors may be more lenient in their evaluations in order to avoid conflicts with disgruntled employees, generating what Prendergast (1999, p.30) refers to as "centrality" or "leniency" bias. On the other hand, rent-seeking behaviour emerges by workers who attempt to creep up to their supervisors in order to influence their subjective evaluation and hence derive personal advantage. Added to these problems are assertions that financial incentives are likely to undermine collaboration and team work, emphasize the power asymmetry between management and workforce, and reduce risk taking, creativity and innovation (Kohn, 1993).

In addition to the aforementioned objections to incentive pay, there are also non-economic concerns that were firstly identified in the social psychology literature. The contention is that the use of extrinsic incentives may erode *intrinsic motivation* and satisfaction, which will ultimately have counterproductive effects on productivity and profitability (Deci, 1971; Lepper et al, 1973). These claims, which constitute 'one of the most important anomalies in economics' (Frey and Jegen, 2001), have, nonetheless, not been mirrored in the empirical evidence reported by economists. For example, Lazear (2000) shows significant positive effects of incentive pay on productivity (in the range of a 44-percent gain) in his unique dataset of a firm that changed its established compensation practice (Safelite Glass Co.). Nevertheless, it may be that economists have identified the short run benefits of incentives, and any long run negative effects on

employee motivation and job satisfaction postulated by psychologists have yet to be witnessed in the data.

A careful examination of the link between PRP and job satisfaction may therefore unveil significant insights into the workings of incentive pay, and the manner in which it affects productivity in the longer run. Therefore, it is the primary aim of this paper to examine how the increasingly changing nature of compensation methods has affected attitudes towards work by otherwise similar individuals. To do so, the practice of a growing number of economists, who use self-reported job satisfaction data to proxy the theoretical economic concept of utility, is followed. Based on the reasoning of conventional microeconomic models one would expect to observe no significant differences in job satisfaction between the marginal workers receiving PRP and those paid a fixed salary. Nonetheless, the disparity in the psychological processes and in the workplace environments of the two types of workers leads to the expectation that salient differences in utility could arise, especially in a world of imperfect labour mobility.

It is important to point out that this study is the first test of "motivation crowding out theory" (Frey and Jegen, 2001) that is not based on circumstantial or laboratory evidence. Given that the productivity effects of PRP are hard to examine due to data restrictions (except for single firm studies as in Lazear, 2000), an underlying implication of the psychological theory is tested here instead, namely that intrinsic satisfaction should decrease under PRP when motivation crowding out is at work. For this purpose, the self-reported satisfaction responses of employees concerning the actual work itself are therefore utilized, since we regard these to be satisfactory proxies of individual intrinsic motivation.

In addition, this is one of the first ever studies to examine the impact of PRP in a job satisfaction framework, which is important given that the composition of an employee's payment package is one of the most important elements of his/her overall working conditions. Drago et al. (1992), using Australian establishment data, McCausland et al. (2005) using the UK British Household Panel Survey (BHPS) and Heywood and Wei (2006), using the US NLSY data, are the only other papers to the authors' knowledge that have looked at this topic.

The remainder of the chapter is organised as follows. In the next section the theoretical predictions regarding the incentives-job satisfaction relationship are examined. In section 3 the data are described and summary statistics are displayed. Section 4 details the econometric methodology used. The econometric estimates of the job satisfaction regressions are then presented in section 5. Finally, conclusions are offered in section 6.

2. Job Satisfaction and Incentives

2.1 Theoretical predictions on the effect of incentive pay on job satisfaction

While the literature on happiness and well-being has advanced at a rapid pace,[ii] and the theory of firms' choice of incentive contracts is firmly rooted in the agency problem, formal theoretical consideration of the impact of financial incentives on job satisfaction, incorporating both economic and psychological elements, has been limited. From conventional economic thought it is well-known that due to the existence of information asymmetries that result in a conflict of interests between a risk-neutral principal and a risk-averse agent, an efficient contract must balance the goals of full insurance and first-best incentives. At the optimum, *given the agent's inherent disutility for exerting effort*, a

firm can induce higher levels of effort by tying the agent's compensation to the random realizations of his output. Choosing to do so, however, implies that the expected value of the agent's wages must compensate him for the risk intrinsic in the production process and the disutility of the extra effort. It follows that the (reservation) utility of individuals who receive performance-enhancing pay should, in equilibrium, be equal to that of non-recipients.

This can be illustrated using a variation of the simple Lazear (1986, 2000) model.[iii] According to this classic "hidden action" framework, a risk-averse agent chooses an effort level $e \geq 0$ with convex disutility $c(e)$ ($c' > 0$ and $c'' > 0$), which is unobserved by the principal. There is noise in the production process, in the sense that the output, y, produced by the agent's effort is also dependent on some random component $\varepsilon \sim N(0, \sigma^2)$:

$$y = e + \varepsilon \tag{1}$$

A risk-neutral principal who cannot observe the effort undertaken by the agent may still design a contract to provide incentives, by conditioning payments on the realized value of output, $w(y)$. The optimal contract can then by found as the solution to the optimization program of maximising the principal's expected value of profit, $E\Pi$, subject to an incentive compatibility and participation constraint:

$$\max_{\{s,b\}} E\Pi = E[y - w] \tag{2}$$

$$s.t.\ \max_{e} EU = Eu(w,e)\ \ u_1' > 0,\ u_2' < 0,\ u'' < 0$$

$$Eu(w,e) \geq U_0$$

where U_o is the employee's reservation utility. Following Holmstrom and Milgrom (1991), if we assume an exponential utility function $u(w,e) = -exp[-r(w-c(e))]$, where r is the agent's coefficient of absolute risk aversion, the optimal wage contract takes the simple linear form:

$$w(y) = s + by \qquad (3)$$

This consists of a fixed salary, s, which compensates the agent for the risk intrinsic in the production process, and a marginal reward, b, which measures the sensitivity of the incentive scheme.[iv] It follows that at the optimum incentives should be less sharp the noisier is the output measure, the larger is the agent's degree of risk aversion, and the higher is the marginal cost of effort:

$$b^* = 1 / (1 + r\sigma^2 c'') \qquad (4)$$

Given that the intensity of the incentive scheme, b, decreases with the measure, c, of disutility of effort, it follows that an agent for whom the disagreeability of effort has less weight than it does for someone else will be more attracted to a compensation rule which

privileges payment by results. To illustrate this, assume that employees are differentiated according to their disutility of effort, which is inversely related to their skills (*S*). Moreover, suppose that there are two types of workers, high-skilled, *H*, and low-skilled, *L*, with $\frac{\partial e}{\partial S} < 0$ (that is, high-ability workers need less effort to achieve the same level of output as those of low-ability, implying that *L*-type workers have steeper indifference curves). From Figure 1, which depicts the utility contours and effort decisions of the two kinds of workers, it is clear that when a firm offers a fixed wage ($w = s$), both agents will supply the minimum required effort below which they are fired (which we set here to be equal to zero, for simplicity, at point A). Consider now that the firm introduces a variable pay scheme of the form shown below:

$$w = \max(s, by) \tag{5}$$

so the employee receives s if $0 \leq y \leq y^*$ and by if $y > y^*$. It is evident that in this case the *L*-type workers will continue to supply the lowest possible level of effort (point A), thus enjoying the same level of utility as before. In contrast, it will now be in the interest of the *H*-type employees to exert a higher amount of effort, as they will be compensated accordingly (i.e. move to point B). In this manner, the firm induces an increase in the average production. Importantly, though this comes at the expense of a greater variance of the employees' output, it does not adversely affect the utility of the average employee, since the switch from a fixed to a variable wage is implemented in such a way that the

utility of the marginal worker is equalized between the two payment schemes. Of course, if the firm decides not to guarantee a minimum wage, and all employees receive $w = by$, *L*-type employees will suffer a utility loss as they will move to a lower indifference curve at point C. This position is not sustainable though in a world of perfect labour mobility, as it is expected that the lower ability workers will be inclined to quite the firm in favour of another one which offers a fixed salary (thus returning back to their initial utility point A). So the offer of PRP will only lower the average satisfaction of the workforce provided that the mobility of labour is imperfect, while no significant differences in the utility of workers under alternative compensation arrangements should arise in long-run equilibrium.

2.2 The crowding out effect

A popular psychological literature has argued, nonetheless, that once one allows for the fact that rational individuals may receive *intrinsic satisfaction* from their jobs, extrinsic intervention may trigger psychological responses that will alter the agent's utility. This forms the basis of cognitive evaluation theory (Deci and Ryan, 1985), which asserts that the ultimate effect of performance-contingent compensation on individual motivation depends on its impact on perceived self-determination and esteem. Thus, it has been argued that if incentives are perceived by individuals as being *supportive*, they facilitate worker autonomy and foster self-esteem, thus enlarging self-determination. In that case *intrinsic* motivation is *crowded-in*, and PRP schemes should enhance inherent job satisfaction. In contrast, rewards that are regarded as *controlling*, or as intended to coax the individual into performing an activity, are likely to cause a shift in the attributed

cause of the behaviour from an internal to an external source.[v] It follows that for those employees who take pride in their work and who rationalize their efforts as reflecting enjoyment of the task, the lost clarity in the employment relationship, following the provision of explicit incentives, may cause "distaste for the required effort" (Kreps, 1997, p. 362). Subsequently, the shift in the locus of control will *crowd-out* the utility that employees derive from the work itself (also known as the *'hidden cost of reward'*). For either of these reasons it is expected that monetary inducements are unlikely to have a neutral effect on the subjective job satisfaction scores of individuals.[vi]

The implications of crowding out theory for the average satisfaction of the workforce are displayed in Figure 2. The difference with Figure 1 is that the *H*-type workers have now been separated into those who are characterized by a high degree of intrinsic motivation, H_I, and those who are mostly extrinsically motivated, H_x. Though one could make a similar distinction for the low ability workers, it is believed that their high marginal cost of effort would render their intrinsic motivation to perform a task irrelevant. Consequently, if a firm decides to offer a fixed wage to all of its employees, it is expected that both the low ability and the H_x type of workers will only supply the minimum effort required, as in Figure 1 above. This is the natural outcome of the assumption of marginal disutility of effort. However, allowing for the presence of intrinsic motivation implies that even in the face of a fixed wage the H_I individuals will produce a positive amount of output, say y^* or above. In other words, these employees are willing to exert a positive level of effort simply because they find their jobs inherently pleasurable.

Consider now the case where the firm introduces the variable pay scheme of the sort shown in Equation 5, where y^* is chosen as the lowest possible level of output beyond which the agent's pay is made contingent on his/her performance. As before, there is no change in the situation of the *L*-type workers, given the presence of the minimum wage guarantee. Similarly, with the provision of PRP the extrinsically motivated agents will earn more by producing a higher level of output, y_x, at point B. Nevertheless, the consequences of PRP for the utility and effort decisions of the H_I type of workers are less clear-cut. If these agents perceive such incentive rewards as being supportive, their intrinsic motivation and utility will be crowded-in, leading to a higher level of output and greater job satisfaction (shown by the move from point C to point B). In contrast, if crowding-out takes place, this will reduce their effort and utility (from point C to D), to a level that is consistent with their minimum disposition to perform the task i.e. y^*. *The ultimate effect of PRP on the average job satisfaction of workers therefore depends on the relative proportions of intrinsically and extrinsically motivated agents that are employed in the workplace, as well as on the impact that PRP has on the psychological disposition of the H_I type individuals.* It will also depend on the extent to which the mobility of labour will permit the *L*-type employees, who receive no minimum wage guarantee, and the H_I type workers, whose utility has been crowded-out, to move to alternative employment that suits their preferences best. It is, thus, clear that the incorporation of other-regarding preferences in the economic paradigm, such as intrinsic motivation, influences the sorting and incentive effects of performance-based pay schemes.[vii]

2.3 Other effects of PRP on individual utility

Standard economic theory also fails to account for the fact that PRP will, in all likelihood, alter the recipient's *relative status*. The idea that *reference-dependent preferences* describe human behaviour more accurately (whereby some arguments of the utility function are relative, rather than absolute) is now firmly ingrained in the literature of well-being (Clark and Oswald, 1996; Clark, 1999; Grund and Sliwka, 2003; Ferrer-i-Carbonell, 2005; Panos and Theodossiou, 2006). Thus, if job utility depends on both the level of pay and on pay relative to some reference point or aspiration level, it is clear that incentive pay could significantly affect job satisfaction via both of these routes.

Moreover, given the overwhelming evidence that workers attach an equal (or even greater) value to other facets of their jobs besides wages and hours worked (Van Praag et al., 2003; Skalli et al., 2006), it is to be expected that PRP will affect overall attitudes towards work by influencing individual perceptions of the security of their employment, of inter-personal relationships and of equity and fairness, among others. For example, it has been argued that aggressive PRP systems are detrimental to employee morale as it conflicts with the inherent preference of employees for horizontal equity arrangements, which treat workers of 'comparable worth' at the same level of an organization "fairly" and "equally" (Baker *et al*., 1988). In addition, "the new economics of personnel suggests that where job tenure is substantial, the firm can avoid formal incentives and the attendant costs of monitoring by offering a Lazear-type scheme with upward sloping earnings profiles or deferred compensation" (Drago and Heywood, 1995, p. 6). This logic leads to the prediction that firms that rely on work incentives to motivate employee effort are less likely to foster ongoing worker-firm attachments for that purpose, thus

compromising job security (Valetta, 1999).[viii] Nevertheless, it might also be true that the provision of variable pay may provide firms with sufficient flexibility to avoid layoffs during periods of weak demand, in which case the incidence of PRP could ultimately enhance job tenure. Finally, it is also likely to be the case that in those circumstances in which PRP may require subjective evaluation (for instance, when the problem of multitasking is more acute), there may be discontent on behalf of employees as they may feel that their supervisor's appraisal is not a fair reflection of their performance, or that their line managers do not know enough about their jobs to appraise them accurately and fairly.

The analysis above therefore highlights that the theoretical impact of performance-related pay (PRP) on overall job satisfaction can be ambiguous, especially in a world of imperfect labour mobility populated by heterogeneous agents with varying psychological dispositions. Therefore, in order to shed light on this issue, the empirical analysis of this study examines the impact of PRP on job satisfaction and satisfaction with several facets of jobs, in particular total pay, security, and the actual work itself.[ix] The motivation for using these partial job satisfactions is to unmask the inherent heterogeneity that is associated with a multi-faceted concept such as total job satisfaction. For instance, the discussion above suggested that if the motivation crowding out theory is true, then one would expect to observe an inverse relationship between PRP and the facet of satisfaction with the work itself, which might be considered to be a satisfactory proxy for an individual's intrinsic motivation. In addition, if the logic that companies that use PRP will rely less on implicit contracts to solve the incentive problem is true, PRP should be negatively associated with satisfaction with security. The reverse should hold, however,

if PRP acts as a buffer against the vagaries of the business cycle. Thus, we now turn to the empirical analysis in order to test whether these hypotheses hold.

3. Data and Job Satisfaction Measures

This study uses data from waves 8 to 13 (1998-2003) of the British Household Panel Survey (BHPS). The BHPS is a nationally representative survey that each year interviews a random sample of nearly 10,000 individuals in approximately 5,500 British households, the addresses of which are taken from the National Postcode Address File. The cumulative attrition in the BHPS has been shown to be of a limited magnitude such that it does not lead to serious inference bias (Nathan, 1999; cited in Gardner and Oswald, 2001). It has been conducted annually since late 1991 and contains a wealth of information on employees' personal and employment characteristics. Respondents in employment are also asked about their satisfaction with seven specific facets of their jobs (promotion prospects, total pay, relations with supervisors, job security, ability to work on their own initiative, the actual work itself and hours of work) evaluated on a seven point scale (where a value of one corresponds to 'not satisfied at all' and seven reflects 'complete satisfaction'). The questions regarding promotion prospects, relations with boss, and the use of initiative were discontinued after the seventh wave. Subsequent to their rating of the various partial satisfactions of a job, individuals are asked a final question regarding overall job satisfaction, worded as follows: *"All things considered, how satisfied or dissatisfied are you with your present job overall using the same 1-7 scale?"* As in most empirical work in this field, this study employs these job satisfaction

questions to identify the determinants of the quality of employment as perceived by the individual workers themselves.

The sample is restricted to individuals between 16 and 65 years of age who are in employment (both full and part-time) at the survey date. Those who are self-employed, retired, work in the armed forces and live in Northern Ireland are excluded. For waves 8 to 13 of the BHPS this yields 39,157 observations on 10,887 different individuals. A sizeable portion of this sample (15.54%) corresponds to individuals that replied affirmatively to the question: "*Does your pay include performance related pay*"? This is the main question in the BHPS capturing the presence of pay incentives that are based on *individual* employee performance. A follow-up question also attempts to distinguish that component of pay that is usually supplemented via irregular bonuses and commissions, or rewards based on some measure of overall company performance, such as profits. Specifically, the respondents are asked *"In the last 12 months have you received any bonuses such as a Christmas or quarterly bonus, profit-related pay or profit sharing bonus, or an occasional commission?"* Almost 30.54% of the employees in the sample declare to be receivers of such forms of compensation. Nevertheless, since the payment of Christmas or quarterly bonuses are typically paid to all workers irrespective of performance, while profit-related plans are known to be weakly associated with individual incentives due to the problem of free-riding (Lazear, 1998), we include this variable in the empirical analysis as an indicator of *gain-sharing (GS) schemes*. This should provide a more comprehensive picture of the overall effect that various incentive devices that companies employ as part of their standard HR toolkit has on the well-being of their employees.

Table 1 contains the characteristics of employees with and without PRP. The percentage of male workers is higher among those receiving PRP than it is among those on alternative wage schemes. Employees whose remuneration is linked to their performance are also more likely to be younger, have union coverage at their workplace, in full-time and permanent jobs offering promotion and career opportunities (in the sense that wages rise on an incremental scale) and in larger firms. They are also found primarily among managerial/administrative and clerical/secretarial occupations and in the private sector or the Civil Service. No major differences exist with respect to educational qualifications and marital status.

The distributions of job satisfaction by facet and method of pay are displayed in Figures 3.a-3.d. While a higher proportion of employees receiving incentive pay state the satisfaction values of 3 or 5, a larger percentage of workers on other pay systems consider themselves as completely satisfied (level equal to 7). It is also evident that in general there is a bunching of employee responses towards the higher satisfaction categories.

Finally, to gain some insight into the correlations of the raw data, Table 2 presents the means of overall and of three partial job satisfactions over some of the characteristics of interest for this study. The data demonstrate that men are noticeably less satisfied than women with their jobs. There is some evidence of a mild U-shaped relationship of job satisfaction with age, though the timing of the upturn differs for each of the facets. Individuals with a partner are happier with their jobs compared to those who are single, as are those who work in smaller establishments and are not members of a trade union. Public sector workers feel more satisfied with the security of their job and the work they perform, compared to their private sector counterparts, though they appear to be less

satisfied with their pay. Moreover, there exists an inverse relationship between educational attainment and overall satisfaction, though this is not immediately obvious for the two partial satisfactions of pay and security. Finally, while individuals in receipt of PRP report higher satisfaction scores with their pay, those workers on alternative compensation schemes seem to be more satisfied on average with the work itself and the security of their jobs. This could account for the higher mean overall satisfaction of non-PRP workers.

4. Methodology and Econometric Issues

For the rest of the paper a multivariate regression methodology is employed in order to uncover the true *ceteris paribus* influence of the explanatory variables on job satisfaction. The empirical framework that is employed assumes that (either partial or overall) job satisfaction (*JS*) of individual *i* (*i* = 1,…, N) in time period *t* (*t* = 1,…,6) is a function of a variety of individual and job characteristics:

$$JS_{it} = \alpha_1 + \alpha_2 PRP_{it} + \alpha_3 GS_{it} + \alpha_4 \mathbf{X}_{it} + \alpha_5 \mathbf{T}_t + u_{it} \qquad (6)$$

where *PRP* is an indicator capturing whether the individual is working under a performance-based scheme, *GS* differentiates between those workers who have received a gain-sharing bonus and those who have not, **X** is a vector of other individual and employment variables assumed to influence job satisfaction, **T** is a vector of yearly dummy variables capturing the presence of fixed time effects (such as changing

technologies or shifting managerial styles, both of which could potentially affect the relationship of PRP and job satisfaction), the α's are associated coefficients, and u_{it} is a randomly distributed error term with $E(u_{it}) = 0$, $Cov(\mathbf{X_{it}}, \mathbf{T_t}, u_{it}) = 0$. Of course, simple OLS estimation of equation (6) is likely to reveal a distorted effect of PRP on job satisfaction, given the presence of unobserved heterogeneity among the employees of the sample, which is particularly pronounced in this case by the non-random sorting of workers into particular wage schemes. Specifically, as Lazear's (1986) model has convincingly illustrated, firms offering PRP are likely to attract workers of higher ability, ambition or talent. Given that these individual attributes, which are likely to be correlated with both the PRP and job satisfaction variables, are unobserved to the survey statistician, it follows that an OLS regression will lead to inconsistent estimates. In order to overcome the selectivity issue, it has thus been deemed necessary to estimate equation (6) using a fixed effects model of panel analysis. As is standard (Wooldridge, 2002), the idiosyncratic disturbance term u_{it} is split into the time-invariant fixed individual effect, ε_i, and a pure random error term, η_{it}, with $E(\eta_{it}) = 0$ and $E(\varepsilon_i, \eta_{it}) = 0$, as follows:

$$JS_{it} = \alpha_1 + \alpha_2 PRP_{it} + \alpha_3 GS_{it} + \alpha_4 \mathbf{X}_{it} + \alpha_5 \mathbf{T}_t + \varepsilon_i + \eta_{it} \qquad (7)$$

Given that with the estimation of equation (7) the influence of any fixed individual effects is controlled for, it is hence expected that the 'true' influence of PRP on the stated job satisfaction of individuals will be uncovered.

However, implementing the above methodology when the dependent variable (JS) is ordinal in nature can be problematic. It has only been until recently that the literature has investigated the potential properties of estimators dealing with fixed effects in an ordinal framework. Indeed, preliminary evidence seems to suggest that fixed-effects well-being equations have a similar structure to cross-section equations (Clark and Oswald, 2002). Moreover, in one of the most comprehensive studies of this type, Ferrer-i-Carbonell and Fritjers (2004) concluded that although the inclusion of panel individual effects is important for the estimation of subjective well-being models, adopting a cardinality assumption for the satisfaction responses does not make much of a difference. Based on this evidence, the decision was thus taken to follow Freeman's (1978) suggestion of approximating JS with a standardized z-score transformation.[x] By measuring the number of standard deviations between a given response and the mean, this procedure enables the estimation of model (7) using the fixed effects estimator as described above.

5. Econometric Results

5.1 OLS estimates of job satisfaction(s)

The regression results in Table 3 show the effect of individual and job characteristics on overall job satisfaction and three different aspects of jobs, without correcting for the presence of fixed effects. These results arise from an OLS estimation of equation (6) using the continuous z-score transformation of subjective job satisfaction as the dependent variable, and after correcting the standard errors for correlation at the individual level. On the basis of these effects, popular concerns regarding the adverse impact of performance pay on job security and the overall well-being of employees

appear to be justified, as a significant *negative* relationship is found between PRP, total work satisfaction, and satisfaction with job security. In contrast, no significant impact of PRP on pay satisfaction and on satisfaction with the work itself is found. This latter facet is also the only one that is unaffected by the presence of gain-sharing schemes in the firm. This is not the case, though, for overall, pay and security satisfaction, on all of which company-level bonuses exert a *positive* influence.

Regarding the influence of the remaining covariates, both the signs and statistical significance levels are in accordance with prior expectations: higher hourly wages significantly increase the overall and pay satisfaction of individuals, but are insignificantly related to satisfaction with security and the actual work itself; job satisfactions are U-shaped with age; males are less satisfied in all aspects of their jobs compared to women; more hours of work reduce overall satisfaction, but have no significant effect on the respective facets; the greater job security associated with permanent contracts leads to a higher level of overall satisfaction, though those working on a full-time employment contract and on the employer's premises appear to be more dissatisfied; good promotion prospects and incremental pay rises unambiguously influence attitudes towards the job in a positive direction; healthy individuals living with a partner report significantly higher job satisfaction scores in all respects; public sector workers are less satisfied with their pay and more satisfied with the security of their job, compared to those working in the private sector; finally, workers with a higher educational attainment level, who work in larger firms, or are members of a trade union, are more likely to report lower partial job satisfactions.

5.2 Fixed effect estimates of job satisfaction(s)

The relationships between PRP and the various measures of job satisfaction are, nonetheless, likely to be biased due to the presence of a sorting effect. As was argued above, due to self-selection the researcher cannot be certain on the basis of simple OLS regressions that the 'pure' influence of variable pay on the satisfaction of employees has been estimated. Instead, the coefficient on the PRP dummy might be capturing the impact on satisfaction of differential person-specific traits which are correlated with the individual's propensity to belong to either mode of pay. Table 4, thus, contains the econometric output of regressions that control for the existence of time-invariant person-effects. Comparing this to Table 3, where no such correction took place, interesting differences in the size and significance of the coefficients arise. In particular, it can now be seen that the significant negative effect of PRP on total satisfaction and satisfaction with job security has disappeared. Furthermore, a clear positive impact of PRP on pay satisfaction emerges. Nevertheless, the insignificant influence of variable pay on an employee's satisfaction with his/her work itself persists.

The insignificant coefficient of PRP in the overall job satisfaction regression gives credence to the fundamental microeconomic model, which predicts that in the long-run the marginal utilities of 'similar' employees on dissimilar compensation plans should be equalized. In addition, no evidence is uncovered in this study to suggest that having pay tied to performance leads to greater feelings of insecurity among workers, resulting from the abandonment of long-term worker-firm attachments by firms. On the contrary, one could draw the conclusion that British employers have structured their incentive policies in a manner that has not imposed unduly uncertainty and layoff risk on to their

employees. After all, firms are usually faced with more than one managerial problem, so there is no reason to believe that they trade-off the various incentive tools that they have in their arsenal. This is also evident by the descriptive statistics of Table 1, which show that individuals receiving PRP are more likely to be found in jobs offering promotion and seniority opportunities. So, it is probable that companies may be using implicit contracts in order to solve one set of problems (e.g. eliminate information asymmetries and safeguard their human capital investments), and PRP to solve another (focusing effort and attention on critical tasks). In this case, the provision of PRP would not compromise job security. Moreover, as was argued before, PRP can ultimately provide firms with adequate flexibility to avoid layoffs when demand for their products weakens.

The evidence also does not support non-economic arguments that incentive pay reduces the 'intrinsic' satisfaction of workers (at least not enough), since no statistical relationship is found between the PRP variable and the satisfaction that workers derive from the work itself, used here as a surrogate for the individual's intrinsic motivation. Nonetheless, the finding of a significant difference in the pay satisfaction of PRP and other employees is reassuring, given that most studies have found the mean wage of the former group of workers to be higher than of those who are paid hourly rates or salaries (Seiler, 1984; Brown, 1992; Booth and Frank, 1999; Parent, 1997; Lazear, 2000).

The marked differences in the size and significance of the coefficients that are reported in Table 4 highlight the importance of taking the heterogeneous nature of employee characteristics into account. In particular, it can be observed that in all cases the coefficients of the PRP variable have increased when the fixed effects specification has been employed, compared to the simple OLS estimates. This is indicative of the fact

that unmeasured person attributes which increase the likelihood of individuals selecting jobs offering PRP (as in the Lazear model above), are associated with lower feelings of worker satisfaction. Such would be the case if traits such as ability, ambition, or talent, raise the individuals' expectations from their jobs, thus depressing their experienced satisfaction, in a manner that mirrors the effect of higher education (i.e. the 'education paradox'). This negative correlation could then account for the underestimated average job satisfaction of PRP workers when using least squares.

In contrast to the insignificance of individual-based incentive schemes that is unearthed using fixed effects regressions, it is interesting to notice that there is no significant change in the effect of gain-sharing systems on employee well-being. In fact, both the beneficial impact of company-level initiatives on the total, pay and security satisfaction of workers, and the insignificant influence on the facet of work itself, persist. There is therefore an important asymmetry in the way in which individual and company-level incentives affect the well-being of employees.

Finally, the coefficients of a number of the remaining independent variables which are potentially correlated with unobserved person-specific characteristics have also been affected when using the fixed effects methodology. Specifically, the U-shaped age effect on satisfaction has disappeared, along with the strong negative impact of union status, work location, higher educational attainment and larger firm size. Interestingly, multiple job-holding and the performance of managerial duties is now associated with significant disutility. Nonetheless, the significance of the coefficients of pay, hours of work, permanent contracts and of promotion and career opportunities remains unaltered.

6. Conclusions

In recent years firms have not only focused on increasing the flexibility of the *external* aspects of the employment relationship (e.g. hiring/firing; contractual arrangements; outsourcing), but have embarked on *internal* flexibility as well. This has entailed (among other practices) the restructuring of the workplace in a manner that gives emphasis to financial flexibility, such as the widespread provision of incentive reward schemes (bonuses, piece-rates, stock options, profit sharing etc.), designed to motivate workers and increase the effort that they exert at their jobs. The aim of this paper has therefore been to investigate the impact that such motivational instruments have had on the (stated) well-being of employees in the UK. Using data from six waves (1998-2003) of the BHPS, and after accounting for the self-selection problem, the main theoretical prediction of the conventional microeconomic paradigm was confirmed, namely that no significant difference in the job utility of marginal workers should arise between those receiving PRP and those on alternative methods of pay. Moreover, doubt was cast on non-economic arguments that incentive pay is likely to crowd-out the intrinsic satisfaction of work, and on popular concerns regarding the adverse impact of PRP schemes on job security.

It is acknowledged at this point that by merely looking at the average differences, the heterogeneous impact that PRP schemes exert on incomparable workers and employments may be concealed. For instance, in McCausland et al. (2005) and Pouliakas (2007) it is shown that PRP exerts a significant positive effect on the mean job satisfaction of (very) high-paid workers only. In addition, it is recognised that the theory of social psychologists regarding the crowding out effect is mainly geared towards jobs

that involve a great deal of task ambiguity and creativity and where the required tasks are multifaceted and hard to monitor. It is in those jobs that intrinsic satisfaction is likely to be most affected by the introduction of contingent rewards schemes. Indeed, significant evidence now exists to suggest that certain workers tend to value the intrinsic characteristics of the job task performed more than the pay that they get (Skalli et al., 2006; Lafranchi et al., 2006). This would imply that in certain organisational environments where intrinsic work motivation is high (e.g. public sector/non-profit jobs), the need for incentive pay is reduced and different work arrangements need to be designed instead. Although the impact of such differences in occupational characteristics has not been investigated here, it clearly constitutes a matter for future research.

What has been highlighted in this paper, though, is that there is an important asymmetry in the manner in which individual and gain-sharing incentives affect job satisfaction, and hence the productivity of the workforce, as only the latter are consistently found to exert a positive effect on employee well-being.

FIGURE 1
The impact of PRP on the effort and utility of workers

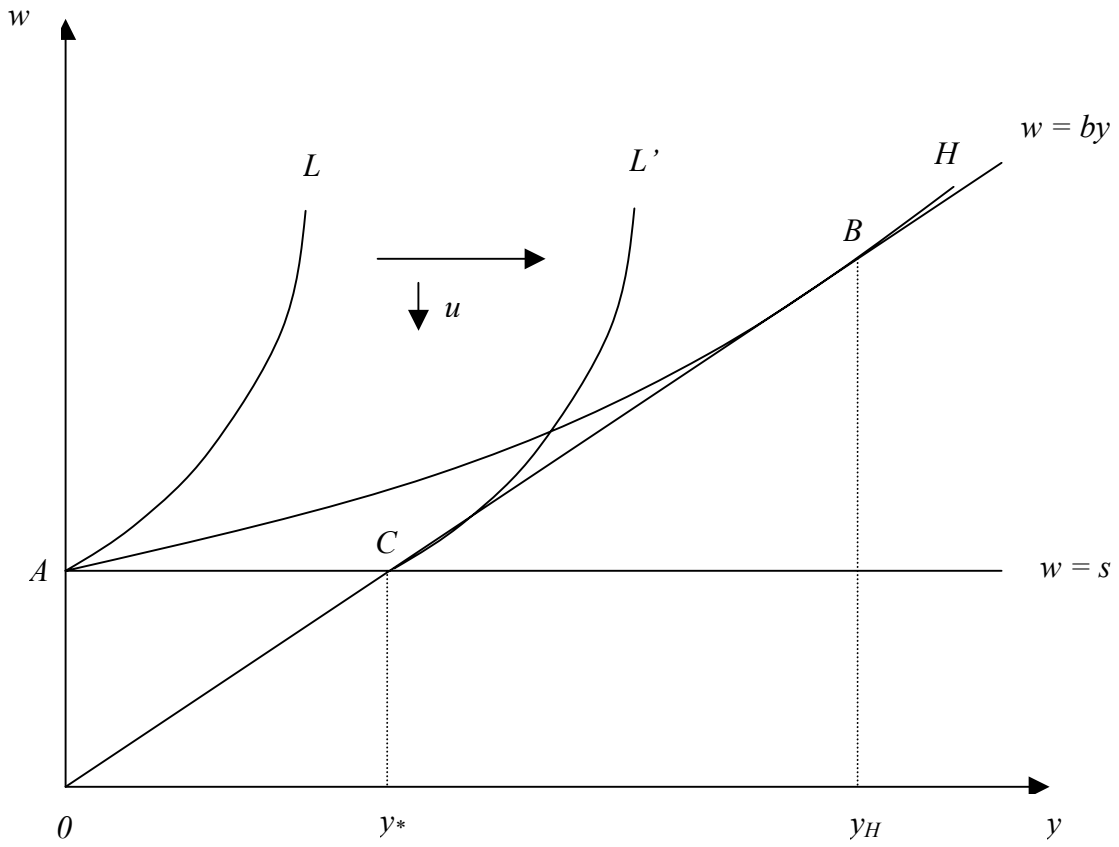
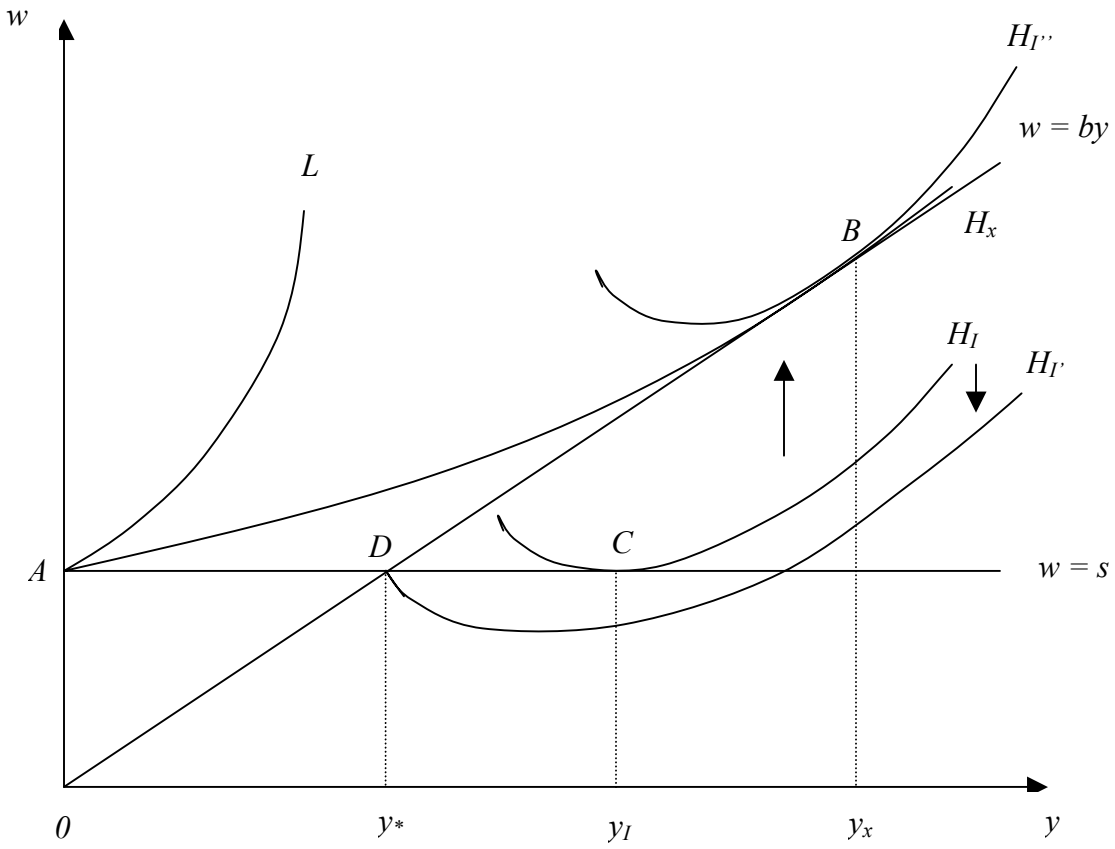


FIGURE 2
The impact of PRP on the effort and utility of workers –
the crowding out effect



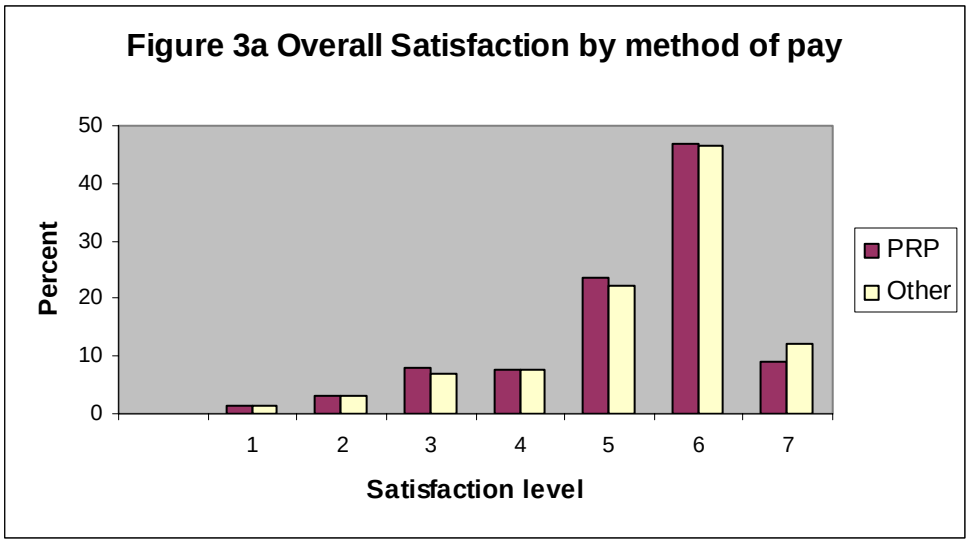


Figure 3a Overall Satisfaction by method of pay
Percent
50
40
30
20
10
0
1
2
3
4
5
6
7
Satisfaction level
PRP
Other

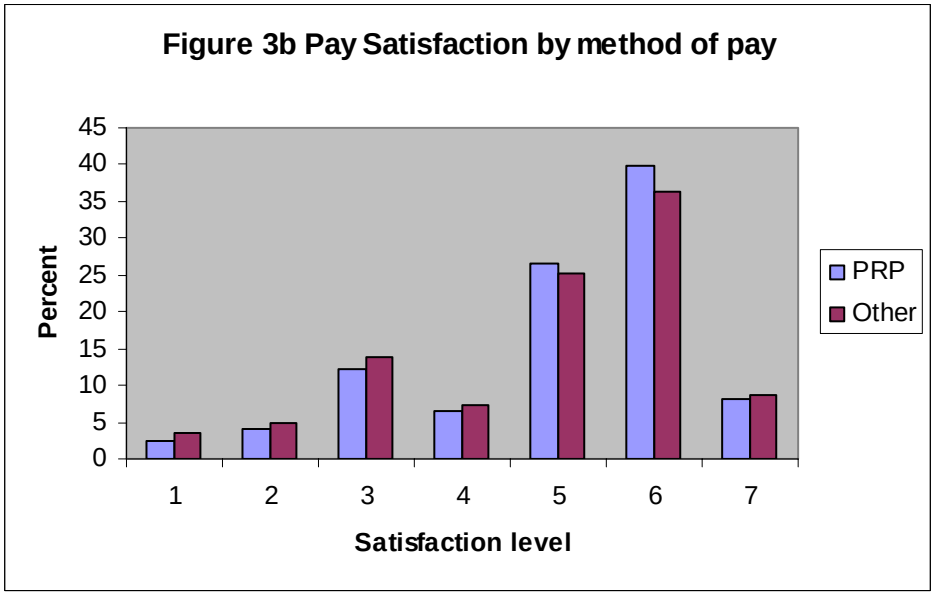


Figure 3b Pay Satisfaction by method of pay
Percent
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
Satisfaction level
PRP
Other

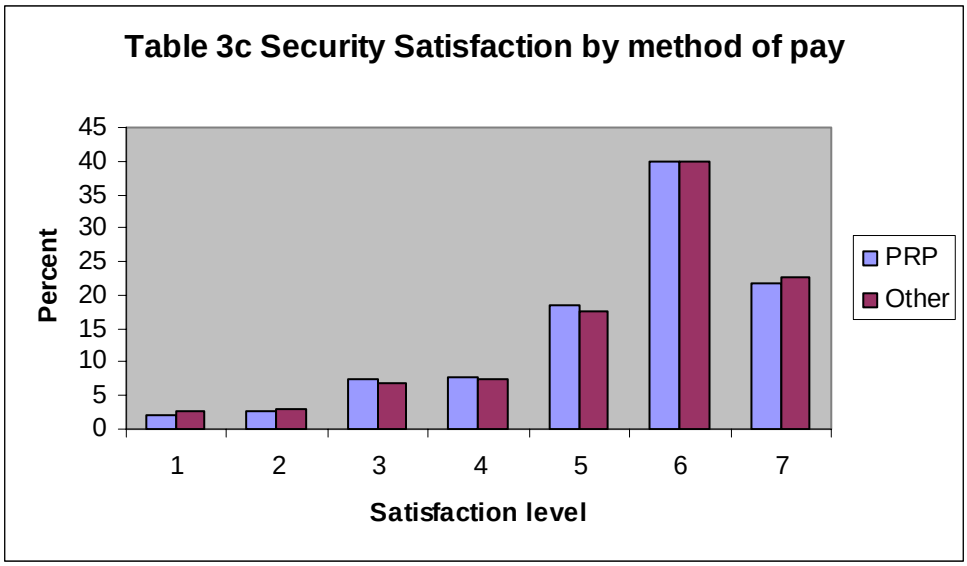


Table 3c Security Satisfaction by method of pay
Percent
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
Satisfaction level
PRP
Other


Figure 3d Satisfaction with work itslef by method of pay
Percent
50
40
30
20
10
0
1
2
3
4
5
6
7
Satisfaction level
PRP
Other

TABLE 1
Characteristics of employees by method of pay

Characteristics (%)	PRP	Other
Male	58.12	47.22
Female	41.88	52.78
Age 17-19	3.02	3.80
Age 20-25	13.75	12.71
Age 26-35	31.38	26.26
Age 36-45	27.67	27.58
Age 46-55	18.71	21.18
Age 56-65	5.47	8.47
Union	56.39	49.30
No Union	43.61	50.70
Promotion	67.93	47.79
No promotion	32.07	52.21
Wage rise	52.48	45.48
No Wage rise	47.52	54.52
Full-time	89.78	78.74
Par-time	10.22	21.26
Partner	73.59	72.14
No partner	26.41	27.86
Educ: No qualifications	6.74	12.11
Educ: O-level	25.35	27.23
Educ: A-level	16.32	12.84
Educ: Other higher	28.52	29.16
Educ: First/Higher	23.07	18.66
Contract: Permanent	98.60	92.36
Contract: Non-permanent	1.40	7.64
Size: 1-24	24.33	36.67
Size: 25-99	24.95	25.09
Size: 100-499	28.13	22.10
Size: 500+	22.59	16.15
Sector: Private	76.20	67.44
Sector: Civil Service	11.52	2.62
Sector: Local Govt	7.71	16.05
Sector: NHS/Higher education	1.45	8.74
Sector: Non-profit organisations	1.25	3.66
Sector: Other	1.86	1.49
Occupation: Managers and Admin	22.43	12.56

Occupation: Professional	10.42	10.08
Occupation: Ass. Prof. and Technical	10.97	11.84
Occupation: Clerical and Secretarial	21.14	17.73
Occupation: Craft & Related	10.11	10.05
Occupation: Personal & Protective Srv	3.69	12.63
Occupation: Sales	8.76	7.45
Occupation: Plant & Machine Operativ	7.95	9.38
Occupation: Other	4.53	8.29

TABLE 2
Mean job satisfaction scores by category and facet

	OVERALL	PAY	WORK ITSELF	SECURITY
Overall	5.33(1.30)	4.91(1.52)	5.41(1.33)	5.41(1.47)
Performance pay	*5.25(1.29)*	*5.00(1.44)*	*5.32(1.33)*	*5.40(1.41)*
No performance pay	*5.34(1.30)*	*4.89(1.54)*	*5.43(1.33)*	*5.41(1.48)*
Male	5.20(1.32)	4.82(1.50)	5.34(1.34)	5.29(1.50)
Female	5.45(1.26)	4.99(1.53)	5.48(1.32)	5.53(1.43)
Age: 17-19	5.41(1.31)	4.74(1.60)	5.28(1.45)	5.55(1.42)
Age: 20-25	5.24(1.33)	4.68(1.57)	5.28(1.38)	5.53(1.47)
Age: 26-35	5.31(1.27)	4.92(1.48)	5.38(1.30)	5.46(1.41)
Age: 36-45	5.31(1.30)	4.95(1.50)	5.41(1.32)	5.32(1.49)
Age: 46-55	5.35(1.30)	4.96(1.53)	5.49(1.32)	5.33(1.50)
Age: 56-65	5.53(1.26)	5.04(1.58)	5.61(1.30)	5.50(1.51)
Partner	5.36(1.27)	4.97(1.49)	5.45(1.31)	5.42(1.46)
No partner	5.24(1.35)	4.73(1.58)	5.31(1.38)	5.40(1.49)
No educ qual	5.48(1.36)	4.97(1.59)	5.50(1.39)	5.40(1.57)
O-levels or equiv	5.38(1.29)	4.94(1.52)	5.42(1.33)	5.47(1.44)
A-levels or equiv	5.28(1.26)	4.83(1.50)	5.38(1.29)	5.37(1.47)
Nursing and other higher	5.32(1.28)	4.89(1.49)	5.43(1.31)	5.38(1.45)
First, teaching, higher degree	5.21(1.29)	4.93(1.51)	5.35(1.32)	5.40(1.49)
Private sector	5.3(1.31)	4.90(1.52)	5.38(1.34)	5.36(1.47)
Public sector	5.39(1.25)	4.89(1.52)	5.46(1.30)	5.53(1.45)
Non-profit	5.49(1.23)	5.02(1.54)	5.67(1.24)	5.50(1.44)
Work size: 1-24	5.46(1.27)	4.94(1.55)	5.59(1.27)	5.53(1.42)
Work size: 25-99	5.31(1.30)	4.87(1.51)	5.41(1.33)	5.43(1.45)
Work size: 100-499	5.21(1.30)	4.89(1.50)	5.27(1.35)	5.32(1.50)
Work size: 500+	5.24(1.29)	4.91(1.48)	5.26(1.36)	5.31(1.50)
Union	5.27(1.29)	4.90(1.49)	5.33(1.35)	5.34(1.51)
Non-union	5.37(1.30)	4.91(1.55)	5.49(1.31)	5.48(1.43)

Notes: Standard deviations in parentheses.

TABLE 3
OLS estimates of job satisfaction and satisfaction with facets of jobs

	Overall		Pay		Security		Work Itself	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
PRP	**-0.037**	**(0.019)****	**0.008**	**(0.017)**	**-0.034**	**(0.018)***	**-0.024**	**(0.019)**
GS	**0.045**	**(0.015)*****	**0.066**	**(0.015)*****	**0.073**	**(0.015)*****	**0.003**	**(0.015)**
Personal/Job								
LN(PAY)	0.088	(0.019)***	0.548	(0.020)***	-0.001	(0.019)	0.006	(0.019)
AGE	-0.025	(0.005)***	-0.022	(0.005)***	-0.045	(0.005)***	-0.008	(0.005)
AGESQUARE/1000	0.336	(0.059)***	0.284	(0.061)***	0.519	(0.058)***	0.159	(0.060)***
SEX	-0.136	(0.019)***	-0.185	(0.019)***	-0.095	(0.018)***	-0.081	(0.019)***
HOURS	-0.004	(0.001)***	-0.001	(0.001)	0.001	(0.001)	0.000	(0.001)
UNION	-0.135	(0.018)***	-0.067	(0.018)***	-0.189	(0.018)***	-0.143	(0.019)***
PERMANENT	0.118	(0.032)***	-0.062	(0.032)*	1.066	(0.040)***	0.030	(0.032)
PROMOTION	0.209	(0.015)***	0.135	(0.014)***	0.224	(0.014)***	0.162	(0.015)***
TRAVELTIME	-0.001	(0.000)***	-0.001	(0.000)**	-0.002	(0.000)***	0.000	(0.000)
PARTNER	0.080	(0.018)***	0.089	(0.019)***	0.066	(0.018)**	0.057	(0.018)***
FULL TIME	-0.140	(0.029)***	-0.221	(0.031)***	-0.139	(0.028)***	-0.095	(0.030)***
PAY RISE	0.119	(0.014)***	0.126	(0.014)***	0.129	(0.014)***	0.081	(0.014)***
TWO JOBS	0.005	(0.024)	-0.025	(0.025)	0.001	(0.023)	0.004	(0.024)
MANAGER	0.050	(0.024)**	0.064	(0.023)***	0.104	(0.024)***	0.092	(0.024)***
SUPERVISOR	0.004	(0.019)	-0.010	(0.019)	0.063	(0.018)***	0.033	(0.019)*
JOB PLACE	-0.060	(0.021)***	-0.019	(0.021)	0.014	(0.021)	-0.104	(0.021)***
Human Capital								
O-LEVELS	-0.094	(0.030)***	-0.088	(0.030)***	0.008	(0.029)	-0.070	(0.029)**
A-LEVELS	-0.164	(0.034)***	-0.152	(0.033)***	-0.073	(0.033)**	-0.095	(0.034)***
OTHER HIGHER	-0.166	(0.031)***	-0.187	(0.031)***	-0.077	(0.030)***	-0.119	(0.030)***
FIRST/HIGHER	-0.294	(0.036)***	-0.302	(0.036)***	-0.069	(0.035)**	-0.236	(0.036)***
Firm Size								
25-99	-0.092	(0.018)***	-0.079	(0.019)***	-0.057	(0.018)***	-0.125	(0.018)***

100-499	-0.140	(0.020)***	-0.097	(0.021)***	-0.081	(0.020)***	-0.168	(0.021)***
500+	-0.124	(0.023)***	-0.083	(0.023)***	-0.078	(0.023)***	-0.178	(0.024)***
Sector								
CIVIL SRV	-0.004	(0.042)	-0.137	(0.042)***	0.215	(0.040)***	-0.111	(0.045)**
LOCAL GOVT	0.093	(0.030)***	0.033	(0.031)	0.180	(0.029)***	0.075	(0.030)**
NHS/HIGHER EDU	0.118	(0.034)***	-0.066	(0.037)*	0.259	(0.034)***	0.115	(0.034)***
OTHER	0.040	(0.061)	0.135	(0.055)**	0.105	(0.056)*	0.053	(0.058)
NON-PROFIT ORGS	0.118	(0.039)***	0.065	(0.045)	0.100	(0.039)**	0.161	(0.038)***
Health								
EXCELLENT	0.595	(0.099)***	0.389	(0.076)***	0.467	(0.090)***	0.365	(0.090)***
GOOD	0.438	(0.098)***	0.297	(0.076)***	0.337	(0.090)***	0.222	(0.089)**
FAIR	0.286	(0.099)***	0.205	(0.076)***	0.232	(0.089)***	0.071	(0.089)
POOR	0.162	(0.100)	0.123	(0.078)	0.157	(0.091)***	0.010	(0.092)
CONSTANT	0.200	(0.147)	-0.478	(0.136)***	-0.503	(0.143)***	0.184	(0.142)
N(clusters)	32290(9736)		32271(9735)		32193		32278	
F(vars, clusters)	20.89***		29.01***		35.00***		17.96***	
R2 overall	0.069		0.092		0.120		0.063	

Notes: Standard errors robust to arbitrary heteroscedasticity and the repeat sampling of individuals over time; * significant at 10%; ** significant at 5%; *** significant at 1%; All regressions include controls for region (11), occupation (9), industry (10) and time (6); *Reference groups*: human capital: no educational qualifications; firm size: 1-24; sector: private; health: very poor;

TABLE 4
Fixed effects estimates of job satisfaction and satisfaction with facets of jobs

	Overall		Pay		Security		Work Itself	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
PRP	**-0.022**	**(0.018)**	**0.038**	**(0.018)****	**0.022**	**(0.018)**	**-0.005**	**(0.018)**
GS	**0.033**	**(0.015)****	**0.029**	**(0.015)***	**0.065**	**(0.015)*****	**-0.003**	**(0.015)**
Personal/Job								
LN(PAY)	0.104	(0.023)***	0.451	(0.022)***	0.028	(0.023)	0.046	(0.023)**
AGE	-0.005	(0.021)	0.025	(0.020)	0.024	(0.021)	0.017	(0.021)
AGESQUARE/1000	-0.064	(0.146)	-0.058	(0.140)	0.256	(0.143)*	-0.255	(0.144)*
SEX								
HOURS	-0.005	(0.001)***	0.000	(0.001)	-0.001	(0.001)	-0.003	(0.001)*
UNION	-0.033	(0.021)	0.000	(0.020)	-0.062	(0.021)***	-0.033	(0.021)
PERMANENT	0.074	(0.034)**	-0.016	(0.033)	0.897	(0.034)***	-0.017	(0.034)
PROMOTION	0.221	(0.015)***	0.122	(0.014)***	0.206	(0.014)***	0.154	(0.015)***
TRAVELTIME	0.000	(0.000)	0.001	(0.000)*	-0.001	(0.000)**	0.000	(0.000)
PARTNER	0.025	(0.028)	-0.009	(0.027)	-0.009	(0.028)	-0.065	(0.028)**
FULLTIME	0.036	(0.032)	-0.075	(0.031)**	-0.040	(0.032)	-0.008	(0.032)
WAGE RISE	0.105	(0.014)***	0.104	(0.013)***	0.089	(0.014)***	0.062	(0.014)***
TWOJOBS	-0.051	(0.026)**	-0.006	(0.025)	-0.020	(0.025)	-0.039	(0.025)
MANAGER	-0.060	(0.025)**	0.028	(0.024)	0.025	(0.025)	-0.011	(0.025)
SUPERVISOR	-0.038	(0.019)**	-0.007	(0.018)	0.042	(0.019)**	-0.019	(0.019)
JOB PLACE	-0.032	(0.025)	-0.013	(0.024)	0.029	(0.024)	-0.062	(0.025)**
Human Capital								
O-LEVELS	0.039	(0.087)	0.036	(0.083)	0.056	(0.085)	0.021	(0.086)
A-LEVELS	-0.062	(0.088)	0.059	(0.084)	-0.067	(0.086)	0.011	(0.087)
OTHER HIGHER	0.061	(0.080)	0.107	(0.077)	0.005	(0.078)	0.020	(0.079)
FIRST/HIGHER	0.071	(0.125)	0.070	(0.120)	-0.058	(0.122)	0.087	(0.124)
Firm Size								
25-99	-0.031	(0.020)	-0.014	(0.019)	-0.010	(0.020)	-0.060	(0.020)***

100-499	-0.051	(0.023)**	0.000	(0.022)	0.014	(0.022)	-0.113	(0.023)***
500+	-0.041	(0.027)	0.011	(0.026)	0.020	(0.026)	-0.120	(0.027)***
Sector								
CIVIL SRV	0.052	(0.053)	0.007	(0.051)	0.104	(0.052)**	-0.054	(0.053)
LOCAL GOVT	0.210	(0.041)***	0.144	(0.040)***	0.220	(0.040)***	0.140	(0.041)***
NHS/HIGHER EDU	0.208	(0.049)***	0.028	(0.047)	0.141	(0.048)***	0.193	(0.049)***
OTHER	0.134	(0.054)***	0.122	(0.052)**	0.180	(0.053)***	0.146	(0.053)***
NON-PROFIT ORGS	0.192	(0.052)***	0.084	(0.049)	0.154	(0.050)***	0.295	(0.051)***
Health								
EXCELLENT	0.377	(0.072)***	0.032	(0.069)	0.114	(0.071)	0.159	(0.072)**
GOOD	0.270	(0.071)***	-0.010	(0.068)	0.067	(0.070)	0.069	(0.071)
FAIR	0.186	(0.071)***	-0.038	(0.068)	0.015	(0.069)	-0.006	(0.070)
POOR	0.129	(0.072)***	-0.049	(0.069)	-0.029	(0.070)	-0.046	(0.071)
CONSTANT	-0.521	(0.704)	-1.832	(0.674)***	-2.674	(0.686)***	-0.561	(0.694)
N(clusters)	32290		32271		32193		32278	
F(vars, clusters)	10.21***		12.59***		20.56***		7.39***	
R2 overall	0.010		0.028		0.008		0.016	
within	0.029		0.035		0.056		0.021	
between	0.009		0.033		0.009		0.015	

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%; All regressions include controls for region (11), occupation (9), industry (10) and time (6); *Reference groups*: human capital: no educational qualifications; firm size: 1-24; sector: private; health: very poor;

APPENDIX

TABLE A1 Variable codes with description

Variable	Description
Dependent variables	
OVERALL JS	= respondent satisfaction rating with overall job (1 = 'not satisfied at all', 7 = 'completely satisfied')
PAY	= respondent satisfaction rating of following facet of present job: total pay (including overtime and bonuses)
WORK ITSELF	= respondent satisfaction rating of following facet of present job: the actual work itself.
SECURITY	= respondent satisfaction rating of following facet of present job: job security
Main independent variables	
PRP	= 1, if respondent is in receipt of performance related pay, 0 otherwise
GS	= 1, if in the last 12 months respondent is in receipt of any bonuses such as Xmas or quarterly bonus, profit-related pay or profit-sharing bonus, or an occasional commission
Job and Personal Variables	
LN(PAY)	= natural log of real usual hourly wage with overtime weighted at 1.3
AGE	= age of respondent at date of interview
AGESQUARE	= age squared
SEX	=1, if gender is male, 0 otherwise
HOURS	= number of hours normally worked per week
UNION	=1, if union or staff association represents worker at workplace, 0 otherwise
PERMANENT	=1, if contract is permanent, 0 otherwise
PROMOTION	=1, if current job has opportunities for promotion, 0 otherwise
TRAVELTIME	= minutes spent travelling to work
PARTNER	=1, if married or living as couple, 0 otherwise
PAY RISE	=1, if wage rises on incremental scale, 0 otherwise
TWO JOBS	=1, if respondent has second job, 0 otherwise
FULL TIME	=1, if respondent works full-time, 0 otherwise
MANAGER	=1, if respondent is a manager in current job, 0 otherwise
SUPERVISOR	=1, if respondent is foreman/supervisor in current job, 0 otherwise
JOB PLACE	=1, if work location is employer's premises, 0 otherwise
Human Capital	
NO QUALIFICATIONS	=1, if no educational qualifications, 0 otherwise (omitted)
O-LEVELS	=1, if highest educational qualification is O-levels or equivalent, 0 otherwise
A-LEVELS	=1, if highest educational qualification is A-levels or equivalent, 0 otherwise
OTHER HIGHER	=1, if highest educational qualification is nursing or other higher qualifications
FIRST/HIGHER	=1, if highest educational qualification is teaching qualifications or a first or higher degree, 0 otherwise
Firm Size	

1-24	=1, if respondent works in 1-24 size plant, 0 otherwise (omitted)
25-99	=1, if respondent works in 25-99 size plant, 0 otherwise
100-499	=1, if respondent works in 100-499 size plant, 0 otherwise
500+	=1, if respondent works in 500+ size plant, 0 otherwise
Sector	
PRIVATE FIRM	=1, if employing organization is private firm/company, 0 otherwise (omitted)
CIVIL SRV	=1, if employing organization is civil service or central government, 0 otherwise
LOCAL GOVT	=1, if employing organization is local government/town hall, 0 otherwise
NHS/HIGHER EDU	=1, if employing organization is NHS or higher education, 0 otherwise
OTHER	=1, if employing organization is nationalised industry or other sector, 0 otherwise
NON-PROFIT ORGS	=1, if employing organization is non-profit organization, 0 otherwise
Health	
EXCELLENT	=1, if health over the last twelve months has been excellent compared to people of own age, 0 otherwise
GOOD	=1, if health over the last twelve months has been good compared to people of own age, 0 otherwise
FAIR	=1, if health over the last twelve months has been fair compared to people of own age, 0 otherwise
POOR	=1, if health over the last twelve months has been poor compared to people of own age, 0 otherwise
VERY POOR	=1, if health over the last twelve months has been very poor compared to people of own age, 0 otherwise (omitted)
REGION	= a set of 11 dummies for region, coded according to the Government Office Regions classification, taking the value 1 if the respondent lives in the region and 0 otherwise. The regions are: London, South East, South West, East Anglia, North West, North East, Yorkshire and Humber, East Midlands, West Midlands, Wales, Scotland (omitted: London)
INDUSTRY	= a set of 10 dummies for one-digit industry, taking the value 1 if the respondent's job belongs to the corresponding industry classification, 0 otherwise. The one-digit industries include: Agriculture, Forestry and Fishing (omitted); Energy and Water Supply Industries; Extraction of Minerals and Ores other than fuels, Manufacture of Metals, Mineral products and Chemicals; Metal Goods, Engineering and Vehicles Industries; Other Manufacturing Industries; Construction; Distribution, Hotels and Catering, Repairs; Transport and Communication; Banking, Finance, Insurance, Business Services and Leasing; Other Services.
OCCUPATION	= a set of 9 dummies for one-digit occupation, taking the value 1 if the respondent's job belongs to the corresponding occupational classification, 0 otherwise. The one-digit occupations include: Managers & administrators; Professional occupations; Associate professional & technical occupations; Clerical & secretarial occupations; Craft & related occupations; Personal & protective service occupations; Sales occupations; Plant & machine

	operatives; Other occupations (omitted: managers and administrators).
WAVE	= a set of six dummies taking the value 1 for observations that belong to the corresponding wave of the BHPS, 0 otherwise. Years of sample include: 1998- 2003 (omitted category: 1998).

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Endnotes

i These will typically include unobserved components such synergies with co-workers or current actions that benefit the company in the long-run.

ii Much research has now started with the premise that subjective well-being (SWB) can serve as an empirical proxy for the theoretical concept of utility, thus overcoming the traditional economic practice of evaluating individual preferences by means of revealed behaviour in market situations. This initiative has followed the lead of many years of psychological research, which has illustrated that comparisons of different measures of SWB are often mutually consistent. For example, self-reported SWB has been found to be correlated with physiological measures such as the amount of smiling or frowning, changes in facial muscles (see Kahneman et al., 1999), or the evaluation of the individual's experience by a third party observer (Kahneman et al., 1997). Van Praag (1991) has also shown that individuals belonging to the same language community have a very similar understanding of concepts such as welfare, well-being and happiness. In addition, the use of subjective well-being data was encouraged by the robust econometric findings that were spurred by Freeman's (1978) pioneering work on the inverse relationship between job satisfaction and quit behaviour. Of course, it has been acknowledged that satisfaction questions suffer from a number of weaknesses, such as the discrepancy between remembered utility and experienced utility (which gives rise to what Kahneman et al. (1999) termed the Peak-End evaluation rule), as well as the presence of the adaptation phenomenon (Easterlin, 2001). Both of these issues arouse suspicion regarding the use of time-series data on subjective happiness.

In spite of these problems economists have reported a number of interesting and robust results regarding the determinants of SWB and its domains. Concentrating on the domain of job satisfaction, the literature has found that unemployed individuals have substantially lower levels of well-being compared to the employed, and are permanently 'scarred' as a result of their jobless experience (Clark and Oswald, 1994; Theodossiou, 1998). It has also been argued that much of the wage effect on job satisfaction operates through relative wages (Clark and Oswald, 1996; Clark, 1999; Grund and Sliwka, 2003), or through the individual's own judgement about his past and future financial situations (Easterlin, 2001; Lydon and Chevalier, 2002). Interesting demographical differences have emerged in that women consistently report higher job satisfaction scores than men (Clark, 1997), and the age effect has been reported as being U-shaped (Blanchflower and Oswald, 2004). Finally, satisfaction levels have been consistently found to be negatively correlated with both education (Clark and Oswald, 1996; Sloane and Williams, 1996) and union status (Blanchflower and Oswald, 2004; Drakopoulos and Theodossiou, 1997).

iii The derivation of the optimal pay-performance sensitivity that is presented in this section follows the excellent exposition of Prendergast (1999) and of Gibbons and Waldman (1999).

iv The classic trade-off between risk and incentives now arises, because in order to fully shield the risk-averse agent from income fluctuations the principal should pay the agent a constant wage, but the problem of moral hazard comes into play. To provide first-best incentives the principal should make the agent the full residual claimant (which is equivalent to selling the firm to the agent for a fixed fee), but that provides no insurance. The efficient contract must therefore trade-off these goals of full insurance ($b = 0$) and first best incentives ($b = 1$).

v For instance, financial rewards based on performance may be perceived by workers as signals that the employment relationship is a pure market exchange (Kreps, 1997, p. 363). More recently, Benabou and Tirole (2003) also allowed for the possibility that incentive rewards may alter the intrinsic motivation of agents, by affecting their information sets concerning the nature of the task they perform or their uncertain self-confidence.

vi See Kreps (1997), Frey (1997) and Fehr and Falk (2002) for excellent discussions regarding the relevance and application of such theories for economics.

vii The experimental evidence of Eriksson and Villeval (2004) corroborates this assertion, as it shows that in a setting representing a long-term employer-employee relationship with reciprocity and inequality aversion, a non-negligible fraction of the high-skilled subjects, who in accordance with the theory would have previously selected to work in variable pay schemes, now opt for a fixed pay scheme. This points to the importance of other-regarding preferences when employees select their preferred method of remuneration.

viii This is consistent with McKersie et al.'s (1964) evidence of a positive association between layoff prevalence and incentive prevalence.

ix The choice of the three partial satisfactions, satisfaction with pay, with job security, and with the work itself, as dependent variables, follows Van Praag et.al's (2003) study of the relation between partial and overall job satisfaction in the UK. Using the BHPS, those authors showed that our chosen measures of partial satisfaction are the most important determinants of total job satisfaction. Moreover, in 1998 the satisfaction questions regarding promotion prospects, relations with boss, and the use of initiative in the BHPS were discontinued, thus constraining our ability to use that data.

x It is worth pointing out that no significant changes were found to the results that are reported below when the cardinality approximation to the job satisfaction question was altered and the POLS transformation (as described in Van Praag and Ferrer-i-Carbonell, Ch.2, 2004) was used instead.